

MIL-S-8834F
 AMENDMENT 4
3 May 1996
 SUPERSEDING
 AMENDMENT 3
 7 April 1989

MILITARY SPECIFICATION
 SWITCHES, TOGGLE, POSITIVE BREAK,
 GENERAL SPECIFICATION FOR

This amendment forms a part of MIL-S-8834F, dated 8 June 1977, and is approved
 for use by all Departments and Agencies of the Department of Defense

PAGE 1

- 2 1, SPECIFICATIONS, delete the following "FF-W-100", "QQ-B-626", "QQ-B-750", "QQ-N-290", "QQ-P-416", "QQ-S-698", "MIL-P-997", "MIL-E-9500", and their associated titles
- 2 1, SPECIFICATIONS, MILITARY, add the following
 "MIL-B-5423/16 - Boot, Dust and Water Seal, Bushing Seal, Type A (For Toggle Switch 0 469 Diameter), Style 10
 (Panel Bushing Seal Only) "
- 2 1, SPECIFICATIONS, MILITARY, MIL-M-14, title, delete and substitute "Molding Compounds, Thermosetting"
- Beneficial comments box, bottom of page, preparing activity address, delete and substitute the following "Defense Electronics Supply Center, ATTN DESC-ELDM, Dayton, OH 45444-5765"

PAGE 2

- 2 1, SPECIFICATIONS, MILITARY, delete the following "MIL-P-15037", "MIL-P-18177", "MIL-S-28786", "MIL-C-45662", "MS25196", and their associated titles
- 2 1, STANDARDS, FEDERAL, delete "FED-STD-406" and its associated title
- 2 1, STANDARDS, FEDERAL, add "FED-STD-H28 - Screw Thread Standards for Federal Services"
- 2 1, STANDARDS, MILITARY, delete the following "MIL-STD-105", "MIL-STD-454", "MIL-STD-1549", and associated titles
- 2 1, add military handbook as follows
 "HANDBOOKS
 MIL-HDBK-454 -General Guidelines for Electronic Equipment "
- 2 2, delete and substitute the following

"2 2 Non-Government publications The following documents form a part of this document to the extent specified herein Unless otherwise specified, the issues of documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6 2)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/NCSL Z540-1 - General Requirements for Calibration Laboratories and Measuring and Test Equipment

(Application for copies should be addressed to the American National Standards Institute (ANSI), 11 West 42nd Street, New York, NY 10036-8002, telephone 212-642-4900, fax 212-302-1286

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 1119 - Glycol Industrial Grade Ethylene Standard Specification for

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103-1187)

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INTERNATIONAL ORGANIZATION FOR STANDARDS (ISO)

ISO 10012-1 - Quality Assurance Requirements for Measuring Equipment - Part 1, Meteorological Confirmation System for Measuring Equipment

(Application for copies should be addressed to the American National Standards Institute (ANSI), 11 West 42nd Street, New York, NY 10036-8002, telephone 212-642-4900, fax 212-302-1286

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)"

- After 2.2, add the following new paragraph

"2.3 Order of precedence In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specifications sheets, or MS standards), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained."

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- 3.4.2, delete and substitute the following

"3.4.2 Plastic materials Unless otherwise specified (see 3.1), molded plastic material shall conform to MIL-M-14. Stacked laminations shall not be used for the switch body. Other types of plastic materials may be used provided the manufacturer submits acceptable evidence of performance to the qualifying activity during the qualification test program on the submitted product."

- 3.4.2.1, second line delete "requirement 4 of MIL-STD-454" and substitute "guideline 4 of MIL-HDBK-454"

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- 3.5.3.3, delete the paragraph in its entirety

- 3.5.5, delete and substitute the following

"3.5.5 Hardware For direct Government acquisition, all hardware, (see 3.1), shall be supplied in a separate package and packaged with the switch. Crimp pin contacts, for switches with integrated wire termination, are not supplied with the switch. Unless otherwise specified (see 6.2), QPL sources may provide switches to sources other than the Government, with hardware packaged separately or with specified hardware. Switches packaged separately may be marked with the appropriate MS or M part numbers."

- 3.5.7, line 2, delete "Handbook H28" and substitute "FED-STD-H28"

- 3.5.8, line 2, delete "MIL-STD-454, Requirement 5" and substitute "MIL-HDBK-454 Guideline 5"

- 3.6.1, delete and substitute the following

"3.6.1 Solderability (applicable to solderable terminals) When switches are tested as specified in 4.8.2, the criteria for acceptable solderability shall be in accordance with method 208 of MIL-STD-202."

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After 3.7.1, add the following new paragraph

"3.7.1.1 Marking permanency (applicable to switches with printed circuit board terminals only) When switches are tested as specified in 4.8.2.4, all marking shall remain legible."

- 4.1.1, last line, delete "MIL-C-45662" and substitute "ANSI/NCSS Z540-1, ISO-10012-1, or equivalent system as approved by the qualifying activity"

PAGE 9

- TABLE I Plastic material third column, delete "MIL-P-997", "MIL-P-15037", "MIL-P-18177", and "FED-STD-406"
Fungus third column delete "FED-STD-454" and substitute "MIL-HDBK-454"

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• TABLE II, delete and substitute the following

* TABLE II Qualification Inspection

Inspection	Requirement paragraph	Test paragraph
<u>Group I (2 sample units)</u>		
Examination of product	3 1	4 8 1
Switching characteristics	3 6 3	4 8 4
Strength of terminals	3 6 4	4 8 5
Strength of actuating lever pivot and lever stop	3 6 5	4 8 6
Strength of mounting bushing	3 6 6	4 8 7
Flammability	3 6 22	4 8 23
Examination of product 1/	3 1, 3 4 thru 3 5 9, 3 7, and 3 8	4 8 1
<u>Group II (2 sample units)</u>		
Examination of product	3 1	4 8 1
Marking permanency 2/	3 7 1 1	4 8 24
Resistance to soldering heat	3 6 2	4 8 3
Switching characteristics	3 6 3	4 8 4
Mechanical endurance	3 6 7	4 8 8
Thermal shock	3 6 19	4 8 20
Sealing	3 6 20	4 8 21
Toggle seal (water) 2/	3 6 20 1	4 8 21 1
Environmental seal test 2/	3 6 20 2	4 8 21 2
Examination of product 1/	3 1, 3 4 thru 3 5 9, 3 7, and 3 8	4 8 1
<u>Group III 3/</u>		
Examination of product	3 1	4 8 1
Switching characteristics	3 6 3	4 8 4
Contact bounce (when specified, see 3 1)	3 6 8	4 8 9
Contact voltage drop	3 6 9	4 8 10
Electrical overload, endurance, and temperature rise 3/	3 6 11	4 8 12
Overload	3 6 11	4 8 12 1
Resistive load (dc)	3 6 11	4 8 12 2
Inductive load (dc)	3 6 11	4 8 12 3
Lamp load (dc)	3 6 11	4 8 12 4
Resistive load (ac)	3 6 11	4 8 12 2
Inductive load (ac)	3 6 11	4 8 12 3
Lamp load (ac)	3 6 11	4 8 12 4
Temperature rise	3 6 11	4 8 12 6
Dielectric withstanding voltage 4/	3 6 10	4 8 11
Examination of product 1/	3 1, 3 4 thru 3 5 9, 3 7, and 3 8	4 8 1
<u>Group IV (2 sample units)</u>		
Examination of product	3 1	4 8 1
Switching characteristics	3 6 3	4 8 4
Toggle ice	3 6 17	4 8 18
Sand and dust	3 6 18	4 8 19
Dielectric withstanding voltage	3 6 10	4 8 11
Sealing	3 6 20	4 8 21
Toggle seal (water) 2/	3 6 20 1	4 8 21 1
Environmental seal test 2/	3 6 20 2	4 8 21 2
Examination of product 1/	3 1, 3 4 thru 3 5 9, 3 7 and 3 8	4 8 1

See footnotes at end of table

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TABLE II Qualification inspection - Continued

Inspection	Requirement paragraph	Test paragraph
<u>Group V (2 sample units)</u>		
Examination of product	3 1	4 8 1
Switching characteristics	3 6 3	4 8 4
Dielectric withstanding voltage	3 6 10	4 8 11
Explosion (not required for environmental seal)	3 6 21	4 8 22
Examination of product 1/	3 1, 3 4 thru 3 5 9, 3 7, and 3 8	4 8 1
<u>Group VI (2 sample units)</u>		
Examination of product	3 1	4 8 1
Switching characteristics	3 6 3	4 8 4
Life, dry circuit, low level and intermediate current switching 5/	3 6 11	4 8 12 5
Dielectric withstanding voltage	3 6 10	4 8 11
Examination of product 1/	3 1, 3 4 thru 3 5 9, 3 7, and 3 8	4 8 1
<u>Group VII (2 sample units)</u>		
Examination of product	3 1	4 8 1
Switching characteristics	3 6 3	4 8 4
Shock	3 6 13	4 8 14
Method I	3 6 13	4 8 14 1
Method II 2/	3 6 13	4 8 14 2
Vibration, high frequency	3 6 14	4 8 15
Moisture resistance	3 6 16	4 8 17
Dielectric withstanding voltage	3 6 10	4 8 11
Sealing	3 6 20	4 8 21
Toggle seal (water) 2/	3 6 20 1	4 8 21 1
Environmental seal test 2/ 6/	3 6 20 2	4 8 21 2
Examination of product 1/	3 1, 3 4 thru 3 5 9, 3 7, and 3 8	4 8 1
<u>Group VIII (2 sample units)</u>		
Examination of product	3 1	4 8 1
Switching characteristics	3 6 3	4 8 4
Short circuit closure	3 6 12	4 8 13
Salt spray	3 6 15	4 8 16
Examination of product 1/	3 1, 3 4 thru 3 5 9, 3 7, and 3 8	4 8 1
<u>Group IX (2 sample units)</u>		
Examination of product	3 1	4 8 1
Solderability	3 6 1	4 8 2
Examination of product 1/	3 1, 3 4 thru 3 5 9, 3 7, and 3 8	4 8 1

- 1/ Only one sample unit from group I and one sample unit from group VIII shall be inspected for physical dimensions
- 2/ Where applicable
- 3/ Two switches shall be tested at each voltage, current, and frequency specified (see 3 1) When more than six loads are specified, additional specimens shall be required. Only sample units subjected to resistive loads shall be tested for temperature rise
- 4/ The dielectric withstanding voltage test following electrical endurance is not applicable to switches covered by MS military standard sheets that are approved before 1 January 1971
- 5/ One additional specimen is required for one and two pole switches
- 6/ For switches with integrated wire terminals the terminal-sealing/fluid-immersion test shall be performed as specified on the applicable specification sheets or MS drawings (see 3 1) "

- 4 7 1 2, delete and substitute the following

"4 7 1 2 Group A inspection Group A inspection shall consist of the inspections specified in table III. The inspections may be performed in any order, except dielectric withstanding voltage shall be performed after seal testing "

- 4 7 1 3, delete and substitute the following

"4 7 1 3 Sampling plan Statistical sampling shall be in accordance with tables III and III-1. A randomly randomly selected group(s) of samples is required for subgroups 1 and 2. For acceptance of the lot there shall be zero occurrences of defects

"4 7 1 3 1 Subgroup 1 A sample of parts shall be randomly selected in accordance with table III-1, subgroup 1 sampling plan

"4 7 1 3 2 Subgroup 2 A sample of parts shall be randomly selected in accordance with table III-1, subgroup 2 sampling plan "

- TABLE III, delete and substitute the following

" TABLE III Group A inspection

Inspection	Requirement paragraph	Test method paragraph	Sampling plan
<u>Subgroup 1</u>			See 4 7 1 3 1 1/
Examination of product	3 1	4 8 1	
Material	3 4	4 3 and 4 8 1	
Design and construction	3 5	4 8 1	
Marking	3 7	4 8 1	
Workmanship	3 8	4 8 1	
<u>Subgroup 2</u>			See 4 7 1 3 2 1/
Sealing (as applicable)	3 6 20 2 2	4 8 21 2 2	
Switching characteristics	3 6 3	4 8 4	
Dielectric withstanding voltage	3 6 10	4 8 11	
Contact voltage drop	3 6 9	4 8 10	

1/ At the option of the contractor, documented in-process inspection may be used to satisfy the requirements provided that all of the contractor's in-process control data on these tests are made available to the Government upon request "

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- After table III, add table III-1 as follows

TABLE III-1 Zero defect sampling plan

Lot size	Minimum number of switches to be tested	
	Subgroup 1	Subgroup 2
1 - 8	5	All
9 - 15	5	13
16 - 25	5	13
26 - 50	5	13
51 - 90	7	13
91 - 150	11	13
151 - 280	13	20
281 - 500	16	29
501 - 1,200	19	34
1,201 - 3,200	23	42
3,201 - 10,000	29	50
10,001 - 35,000	35	60

- 4 7 1 4, delete and substitute the following

"4 7 1 4 Rejected lots If an inspection lot is rejected, the lot shall be 100 percent inspected for the defects noted. The contractor may correct all of the defects or remove all of the defective units from the lot. The lot shall then be sampled again in accordance with tables III and III-1. For acceptance, there shall be zero occurrences of defects. Such lots shall be separate from new lots and shall be clearly identified as reinspected lots."

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- 4 7 2 1, line 2, delete "table II" and substitute "table III-2"
- 4 7 2 1 1, second sentence delete and substitute the following "Group B inspection shall be completed in accordance with table III-2 within each 3-year period after initial qualification."

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- After 4 7 2 1 1, add table III-2 as follows

" TABLE III-2 Group B Inspection

Inspection	Requirement paragraph	Test paragraph
<u>Group I (2 sample units)</u>		
Examination of product	3 1	4 8 1
Marking permanency 1/	3 7 1 1	4 8 24
Mechanical endurance	3 6 7	4 8 8
Sealing	3 6 20	4 8 21
Toggle seal (water) 1/	3 6 20 1	4 8 21 1
Environmental seal test 1/ 5/	3 6 20 2	4 8 21 2
Examination of product 2/	3 1, 3 4 thru 3 5 9, 3 7, 3 8	4 8 1
<u>Group II (2 sample units)</u>		
Examination of product	3 1	4 8 1
Shock	3 6 13	4 8 14
Method I	3 6 13	4 8 14 1
Method II 1/	3 6 13	4 8 14 2
Salt spray	3 6 15	4 8 16
Examination of product 2/	3 1, 3 4 thru 3 5 9, 3 7, 3 8	4 8 1
<u>Group III (2 sample units)</u>		
Examination of product	3 1	4 8 1
Electrical overload, endurance, and temperature rise	3 6 11	4 8 12
Overload	3 6 11	4 8 12 1
Resistive load (ac) 3/	3 6 11	4 8 12 2
Temperature rise	3 6 11	4 8 12 6
Dielectric withstanding voltage	3 6 10	4 8 11
Examination of product 2/	3 1, 3 4 thru 3 5 9, 3 7, 3 8	4 8 1
<u>Group IV (2 sample units)</u>		
Examination of product	3 1	4 8 1
Electrical overload and endurance	3 6 11	4 8 12
Overload	3 6 11	4 8 12 1
Inductive load (dc) 4/	3 6 11	4 8 12 3
Dielectric withstanding voltage	3 6 10	4 8 11
Examination of product 2/	3 1, 3 4 thru 3 5 9, 3 7, 3 8	4 8 1
<u>Group V (2 sample units)</u>		
Examination of product	3 1	4 8 1
Life, low level, dry circuit and intermediate current switching 5/	3 6 11	4 8 12 5
Examination of product 2/	3 1, 3 4 thru 3 5 9, 3 7, 3 8	4 8 1
<u>Group VI (2 sample units)</u>		
Examination of product	3 1	4 8 1
Sealing - toggle seal 1/	3 6 20 1	4 8 21 1
Examination of product 2/	3 1, 3 4 thru 3 5 9, 3 7, 3 8	4 8 1
<u>Group VII (2 sample units)</u>		
Examination of product	3 1	4 8 1
Sealing - environmental 1/ 5/	3 6 20 2	4 8 21 2
Examination of product 2/	3 1, 3 4 thru 3 5 9, 3 7, 3 8	4 8 1
<u>Group VIII (2 sample units)</u>		
Examination of product	3 1	4 8 1
Solderability 1/	3 6 1	4 8 2
Examination of product 2/	3 1, 3 4 thru 3 5 9, 3 7, 3 8	4 8 1

- 1/ As applicable
- 2/ Only one sample unit from group I and one sample unit from group III shall be inspected for physical dimensions
- 3/ Test at 115 volts, 60 Hz, room temperature and pressure
- 4/ Test at 28 V dc and altitude when applicable
- 5/ One additional specimen is required for one and two pole switches
- 6/ For switches with integrated wire terminals, the terminal-sealing/fluid-immersion test shall be performed as specified on the applicable specification sheets or MS drawings "

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- 4 8 21 1 1, line 4, delete "MS25196" and substitute "MIL-B-5423/16"
- 4 8 21 2 1, line 3, delete "MIL-E-9500" and substitute "ASTM E 1119"

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- 4 8 23, line 2, delete "method III" and substitute "method 111"

After 4 8 23, add the following new paragraph

"4 8 24 Marking permanency (applicable to switches with printed circuit board terminals, see 3.7.1.1) Switches shall be tested in accordance with method 215 of MIL-STD-202 Only the marked portion of the switch (see 3 7 1) shall be tested "

- 5 1, delete and substitute the following
"5 1 Packaging For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6 2) When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity "

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- 6 3, last sentence, delete and substitute the following
"The activity responsible for the Qualified Products List is Defense Electronics Supply Center, ATTN DESC-ELSP, Dayton, OH 45444-5764 "

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- 6 5, line 2, delete "MS25196" and substitute "MIL-B-5423/16"
- 6 7, delete in its entirety

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- 20 2 1, line 1, delete "table II" and substitute "table III-2"
- 20 2 2, lines 3 and 5, delete "table II" and substitute "table III-2" (two places)

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- 20 1, MATERIAL, delete "BRASS QQ-B-626 COMPOSITION 22" and substitute "ASTM B16, ALLOY UNS C36000"
- 20 1, after FINISH add the following "MIL HARDWARE, Can be replaced by MS25082-B14 (250-40) or MS25082-B8 (469-32) "
- 20 2, FINISH, STEEL, delete "CADMIUM PL QQ-P-416, TYPE II, CLASS 3" and substitute "Suitably protected to resist corrosion "
- 20 2, after FINISH, add the following "MIL HARDWARE, CRES, Can be replaced by MS35333-135 (250 size) or MS35333-136 (469 size) "

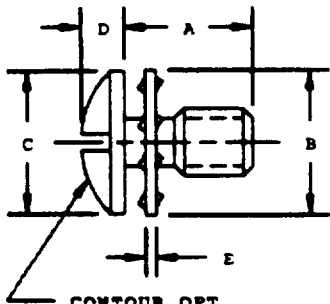
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- 20 3, FINISH, STEEL, delete "CADMIUM PLATE QQ-P-416, TYPE II, CLASS 3" and substitute "Suitably protected to resist corrosion "
- 20 3, after FINISH, add the following "MIL HARDWARE CRES, Can be replaced by MS25081-C4 "
- 30 1, Terminal screw, delete "(Pin Head)" and substitute "(Pan Head)"
- 30 1 MATERIAL BRASS, delete "QQ-B-626 COMPOSITION 22" and substitute "ASTM B16 alloy UNS C36000"

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- 30 2, MATERIAL, BRONZE, delete "QQ-B-750, COMPOSITION A" and substitute "ASTM B139, alloy UNS C51000"
- 30 2, FINISH, BRONZE, delete "CADMIUM PLATE QQ-P-416, TYPE II, CLASS 3" and substitute "Suitably protected to resist corrosion"
- 30 2, after Finish, Bronze, add the following "MIL Hardware, Can be replaced by MS35338-98"
- After 30 2, add the following new paragraph
"30 3 Screw with captive internal tooth lockwasher

	Thread size	A	B	C	D	E
	138-32 UNC-2A	260 219	295 265	290 256	067 071	020 016
	164-32 UNC-2A	250 219	338 327	322 306	096 085	022 018
Screw (Brass)	Material	ASTM B16 alloy UNS C36000, half hard				
	Finish	Silver or tin plate				
	MIL hardware	None				
Lockwasher (Phos bronze)	Material	ASTM B139 alloy UNS C51000				
	Finish	Silver or tin plate				
	MIL hardware	None				

- NOTES, after note 4, add new notes 5 and 6 as follows
"5 Captive washers shall rotate freely on the terminal screw
6 The terminal screws with the captive internal tooth lockwasher shall be threaded to within .024 of the lockwasher"

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- DD Form 1426, preparing activity address, delete and substitute the following "Defense Electronics Supply Center, ATTN DESC-ELDM, Dayton, OH 45444-5765"

The margins of this amendment are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous amendment were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

CONCLUDING MATERIAL

Custodians
Army - CR
Navy - AS
Air Force - 85

Preparing activity
DLA - ES
(Project 5930-1599)

Review activities
Army - AR, AT, MI
Navy - EC, MC
Air Force - 99